CHAPTER 4

GROUNDWATER ASSESSMENT

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In November of 1987, Kentucky refocused its attention on groundwater quality with the release of the Kentucky Groundwater Protection Strategy. A salient document for groundwater protection, the Strategy is a working document which, for Kentucky, announces major new groundwater initiatives. Central to the Strategy is the groundwater protection goal: to maintain and protect the resource for its highest and best use, and to minimize or prevent waste and degradation. Program elements announced in the Strategy include: a proposed classification system equivalent to that proposed by the U. S. EPA; the evaluation of the KPDES system for regulating all discharges to groundwater; a proposed program to certify well pump installers and all non-water well drillers in Kentucky; a proposal to reform oil and gas laws; and various funding proposals to protect aquifers, clean-up non-federal abandoned hazardous waste sites, and for groundwater research and data management.

Sources and Contaminants in Groundwater

Table 29 presents the major sources of groundwater contamination in the state and ranks the top five sources (number one being the most serious). Table 30 lists those substances contaminating groundwater in the Commonwealth from the sources listed in Table 29.

Special Studies

In 1987, Kentucky undertook studies of water well quality in both the Gateway area Development District (Gateway ADD) and the Calvert City area. The purpose of the studies was to evaluate the quality of domestic well water consumed in all or parts of Marshall, Livingston and McCracken counties (Calvert City study) and Bath, Menifee, Rowan, Morgan, and Montgomery counties (Gateway ADD study). Well water was analyzed for 81 constituents including bacteria, pesticides, Safe Drinking Water Act (SDWA) primary and secondary contaminants, and priority pollutants. Well construction data was also gathered. While these studies indicated that the quality of groundwater as a whole was good, isolated incidents of contamination were discovered. Specifically, high fecal coliform bacteria levels were found in some wells where well construction failed to meet modern criteria.

Of the 109 wells surveyed in the Gateway ADD study, the most commonly detected contamination was bacteriological (57 cases). A self-help manual for the domestic well owners has been sent to the well user where this type of contamination was found, so that a proper remedy (simple chlorination or a well recompletion/renovation) could be applied to the supply. Three wells equaled or exceeded recommended levels for the SDWA primary contaminants. No cases of significant contamination were found for the 50 organic compounds analyzed in the survey. While organics were intially detected in 13 samples, sampling or laboratory contamination probably was responsible for three of the well results. Four wells retested negative for organics.

Ninety wells and springs were inspected in the Calvert City area well study. Sixty-four domestic wells or springs, four industrial wells, and composite samples from four public water systems using wells were analyzed for a wide variety of chemical parameters. Of the 64 domestic wells or springs surveyed, the most

Table 29
Major Sources of Groundwater Contamination

Source		Relative Priority
Septic tanks	X*	2
Municipal landfills	X	
On-site industrial landfills (excluding pits, lagoons, surface impoundments)	X	5
Other landfills		
Surface impoundments (excluding oil and gas brine pits)	X	
Oil and gas brine pits	X	4
Underground storage tanks	X	3
Injection wells (incl. Class V)	X	5
Abandoned hazardous waste sites	X	5
Regulated hazardous waste sites		
Salt water intrusion		
Land application/treatment	X	
Agricultural activities	X	
Road salting		
Mining	X	4
Improperly constructed and abandoned (decommissioned) wells	X	4
Spills and poor materials handling or storage	X	
Salt storage	X	
Poor water well construction	X	1

X* = Major Source in Kentucky

Table 30
Substances Contaminating Groundwater

Organic chemicals:		Metals	X
Volatile	X*	Radioactive material	X
Synthetic	X	Pesticides	X
Inorganic chemicals:		Other agricultural chemicals	X
Nitrates	X	Petroleum products	X
Fluorides		Others	Bacteria, Cyanide
Arsenic	X		
Brine/salinity	X		
Other			

X* - Substances present

commonly detected contamination was bacteriological (22 cases). A self-help manual for domestic well owners has been sent to the well user where this type of contamination was found so that a proper remedy (simple chlorination and/or a well recompletion/renovation) could be applied to the supply. Nine wells exceeded or equaled recommended levels for the SDWA primary contaminants. Five wells equaled or exceed standards for nitrate, two wells equaled or exceeded standards for lead, one well equaled standards for selenium, and one well equaled standards for lead and exceeded standards for selenium. These wells are currently being resampled and additional tests are being conducted in an effort to determine the source of contamination. Municipal raw and finished water samples met SWDA primary contaminant recommended levels. One industrial well, which is not used for drinking water, contained vinyl chloride at a concentration of 1 ppb above the SWDA recommended primary contaminant level. No cases of significant contamination were found for the 50 organic compounds analyzed. While organics were detected in four domestic well samples, three were most likely the result of lab contamination. The four wells are being resampled to confirm the results. All organics found in drinking water wells were below SWDA recommended contaminant levels.

Groundwater Problem Areas

The groundwater surveys indicated that a high quality resource may be available to the consumer. However, significant problem areas remain, both in terms of groundwater protection policy and for actual cases of groundwater contamination.

Federal Policy Responsibilities

The federal government has failed to formulate a meaningful national groundwater protection policy. The United States Environmental Protection Agency

(EPA) stated in it's Groundwater Protection Strategy that the principal challenge to EPA in developing a groundwater strategy was to harmonize the implementation of its various groundwater programs and increase protection of this critical resource by enhancing its partnership with the states. EPA believes that the most effective and broadly acceptable way to increase national institutional capability to protect groundwater is to strengthen state programs. However, because of interstate program differences, a harmful practice of interstate transfer of hazardous and solid waste is beginning. This endangers Kentucky's groundwater.

Sanitary landfills involve a risk to groundwater. When refuse is deposited on land, some of the organic and inorganic chemical consitutents are subject to leaching by percolating water. These chemicals can reach aquifers, surface streams and impoundments. Leachate may seriously impair water quality and endanger public health and welfare. Pollutant entering the groundwater zone usually follow paths similar to the uncontaminated groundwater.

Many substances that go to landfills are extensively regulated by either state or federal law. However, while there are more than 2,400 substances listed in the Federal Code of Regulation as hazardous commodities, many of the 70,000 chemical products on the market today have not been reviewed for inclusion in the list. Many of the products reach landfills directly in industrial waste and also from residential waste.

To protect their underground water supplies, communities in the Northeast have had little alternative to interstate shipment of solid waste. The history of the Sayville Solid Waste Disposal Site in Islip (Long Island) New York show the damages from leachate in a poorly designed landfill. The site received residential waste and incinerator residue. The leachate plume extends more than 5,000 feet down gradient of the site, 170 feet in depth and up to 1,300 feet in width. About 1 billion gallons of groundwater have been contaminated and wells in the area have been abandoned. The New York Legislature has ordered Long Island's landfills, which are situated atop the Island's only source of water, to close by 1990. Philadelphia, New York, New Jersey and Massachusetts are also areas that have reached their landfill capacity. Laws and local opposition to new landfills are leading to interstate trash hauling. Long Island alone spends 150 million dollars annually to haul garbage to the Midwest. By 1989, enough garbage will be leaving Long Island to fill one tractor trailer every 6.5 minutes with 40,000 pounds of trash.

In some instances, state laws contribute to the interstate hauling problem. For instance, the 1983 Florida Water Quality Assurance Act prohibits land disposal of hazardous waste and it forbids the Florida Department of Environmental Regulation (DER) from permitting new underground injection wells that inject hazardous waste. A serious problem is that a good portion of the hazardous waste that is not allowed to be disposed of through the land disposal methods in the state is transported to Alabama, South Carolina and other states. The quality of data on materials in interstate transport is extremely poor. Data are needed to show state-to-state and regional transportation patterns.

Under the current state/federal arrangement, individual states are not controlling waste sources within the state and have no inducement to do so. It appears that the easiest way for industries and communities to deal with waste is not to modify systems or contain and reduce waste generation within, but to transport the wastes out of the state. This reflects the basic economic fact that companies and public entities seek the least costly method of achieving pollution abatement.

The unwillingness of the intensively urbanized areas of the Eastern Seaboard to come to grips with their waste generation and the failure of Florida's approach to control waste production can eventually create a problem in Kentucky and other states. Current waste disposal charges remain artifically low because environmental costs of disposal have not been considered. Landfill fees in Kentucky are usually less than $15 per ton while $100 a ton or more is charged on the East Coast. Waste, then, because of economics and because of groundwater protection efforts in other states, is moving from areas where landfill space is at a premium to more rural areas like Kentucky. Because this material moves in interstate commerce, Kentucky's ability to tax and regulate it is diminished. For Kentucky and similarly situated states to have unwanted interstate wastes placed in them serves to subsidize groundwater quality of net waste-exporting states at the expense of the net waste-importing states. Most importantly, no net environmental improvement occurs nationally.

These concerns touch on the topic of risk equity, the appropriate distribution of risks among different members of society. What level of risk do Kentuckians find acceptable for their groundwater? To continue the status quo forces Kentuckians to assume involuntary risks with regard to the placement of out-of-state waste.

Rather than continuing to ignore the problem, EPA should adopt one of the recommendations of the National Academy of Sciences: a policy for encouragement of safe hazardous waste treatment and disposal within the state or local jurisdiction. Solid waste, too, should be contained within state boundaries.

Congress also needs to act. Some form of polluter-pays legislation is needed. This type of regulation or tax should impose the real environmental costs on waste products that enter interstate commerce. The burdens of such a system would be on the pollutant generator, so that polluting industries and communities of other states do not reap economic windfalls for their unwillingness to improve their own waste production practices. The levy set on the trash should be greater than or equivalent to what the cost would have been to retain, treat, and landfill the material in the generating locality or state. Receipts should be used to create an Office of Resource Recovery and Recycling within the EPA where programs to aid local governments to ease their waste problems could be started. The EPA approach of allowing individual states to develop their own groundwater protection plan certainly has some merit. However, the systemic problem with interstate waste transport outlined above is a direct outgrowth of the scheme. States and localities are left with little alternative than to appeal to the federal government to solve the problem.

Domestic On-Site Sewage Treatment

The Cabinet for Human Resources (CHR) has estimated that 60 to 70 percent of Kentucky homesites are not sewered. In 1985, new regulations requiring more comprehensive siting criteria were adopted by CHR and this regulatory effort is changing the way on-site sewage treatment systems have traditionally been installed. Many counties in the past have allowed "seepage pits" in new constructions (these systems are little more than raw sewage injection wells). These counties have now been notified by state officials to stop allowing seepage pits. The ban on new seepage pits is a positive step. Existing seepage pits remain a problem; for instance, it is estimated that 50,000 seepage pits exist in Jefferson County alone. CHR's new system establishes environmental priorities in site selection; before the regulation, environmental considerations were usually an afterthought to development.

City of Irvington

The City of Irvington has depended on a system of public water supply wells for many years. The main well was drilled into a cave conduit and produced a great amount of water. In the summer of 1987, a drought, combined with a pollution incident, closed the supply for several days. Petroleum products were detected in the well water and the water available in the well was diminished. At some point in the past, a petroleum spill or a leaking underground tank contaminated the upper aquifer. The pollution event, however, went unnoticed until the diminished water in the cave conduit allowed the floating contaminant to enter the water supply. This water supply, like many others in Kentucky, withdraws from a karst aquifer. The problems of these aquifers have been documented in prior 305(b) reports and this most recent event in Irvington underscores the vulnerability of this significant resource.

The Irvington water supply problem has apparently been solved with the drilling of several smaller yielding wells in a deeper aquifer. Adequate planning, however, may have avoided the problem altogether. A wellhead protection program is needed for all public water supplies that depend on groundwater in the Commonwealth.

Proliferation of Improperly Abandoned (Decommissioned) Wells

With the thousands of coal mines and the associated drilling of exploration and monitoring wells, and with the construction of various other mineral exploration and engineering wells, Kentucky could rank as the most intensively drilled state in the nation. The individuals in the drilling trade are not taught in a structured way and this results in inadequate subsurface data, failed well construction, and improper abandonments because of a lack of understanding on the part of some of the drillers. State statutes and regulations exist to regulate certain well construction practices; however, state resources often are insufficient to fully regulate the volume of drilling activity. Problems have been recognized in both water well and oil and gas drilling industries.

New water lines have been installed in many parts of the Commonwealth and water wells that formerly were the water source often were not properly plugged. Federal funds used in the construction of the water lines failed to include monies earmarked for proper plugging of the old water supply wells. This failure to properly plug wells, while representing an obvious hazard to children (as the recent event in Texas and a similar event in Kentucky have demonstrated), also allows a direct path for sources of contamination to reach the aquifer. Additionally, little incentive exists to properly plug these wells and as time passes, the wells deteriorate because of inattention from the well owner. A state regulation is needed which encourages plugging old water wells when new water lines are laid.

Thousands of unplugged oil wells, including a great number drilled in the 19th century, can be found in Appalachian oilfields, which includes areas in eastern Kentucky. Thousands of others, salvaged for their steel or iron casing and wellhead equipment, are more difficult or impossible to locate. Four thousand wells were plugged in the seven Appalachian states in 1985; in 1986 the number fell to 3,100. Through November of 1987, 2,100 pluggings had taken place. Economics has lead to the plugging and abandonment of most of these oil facilities. Surface discharge requirements and injection well requirements to protect the environment have had an influence also.

Injection systems which use freshwater as an injection fluid have caused widespread contamination problems in the region and are associated with voluminous surface water discharge of contaminated water. Malfunctioning injection, production, and abandoned wells are also a part of the problem and can contribute to environmental degradation. Large surface water discharges contaminate alluvial aquifers and malfunctioning injection, production, and abandoned wells directly conduct produced fluid into aquifer systems. The U.S. EPA has begun to exercise its authority in addressing the freshwater-waterflood problem.

In 1987, the U.S. EPA entered a consent decree which will affect groundwater in large portions of Johnson and Lawrence counties in Kentucky. The Martha Field was recently closed for violations of the SDWA's Underground Injection Control Program. The plugging of 1,380 oil production and water injection wells are a part of the consent decree as is a provision for developing new water supplies in the affected area. Groundwater will be monitored for ten years in the primary aquifers in the region.

CHAPTER 5

SPECIAL STATE CONCERNS

OIL BRINE IMPACTS

Oil brine pollution problems in Kentucky streams were documented in the 1986 Report to Congress. During this biennium, the discharge of brines to Kentucky waters has remained a serious problem, particularly in portions of the Licking and Kentucky River drainages (see Table 31). The brines have degraded water quality, impacted aquatic life and created problems with public drinking water supplies. The City of Salyersville has experienced problems with treating its drinking water supply because portions of the Licking River are periodically laden with oil brines. A monitoring station in Cave Run Lake, a Licking River impoundment located approximately 55 miles downstream of Salyersville, indicates that the chloride concentration in this reservoir has been steadily increasing during the past few years. To date, the concentrations are not considered toxic to aquatic life; however, if chloride concentrations continue to rise, chronic toxicity problems may develop for sensitive species.

The Kentucky American Water Company, which serves the City of Lexington and portions of several adjacent counties, has observed excessive concentrations of bromide in the Kentucky River at their water withdrawal point. The highest concentrations typically occur in the fall during rain events which follow drought periods. The bromides are known to be instrumental in the formation of trihalomethanes, which are known to be carcinogenic. High concentrations of bromide in the raw water supply have occasionally resulted in the formation of trihalomethanes in the Lexington public water supply. Detected amounts have occasionally exceeded the maximum contaminant level listed in Kentucky's Drinking Water Regulations.

It is estimated that there are between 10,000 and 12,000 oil and gas facilities that discharge varying amounts of produced water into the waters of the Commonwealth. Very few of these are covered by discharge permits. The Division of Water (DOW) promulgated numeric chloride criteria for the protection of aquatic life as a part of revisions to state water quality standards in April 1985. This resulted in a lawsuit by Kentucky oil and gas producers. The suit was settled out of court through an agreement allowing an economic exemption if the producers met certain criteria regarding the economic benefits of their facilities and minimal environmental impact to the receiving streams.

Consequently, DOW attempted to issue permits with exemptions to criteria, where appropriate, to satisfy the agreement between Kentucky and the oil and gas industry. EPA then objected to the permits, citing numerous technical and regulatory deficiencies with the exemption process. Recognizing that DOW was still constrained by the settlement agreement, EPA promulgated a federal water quality criterion for the state of Kentucky. Given the federal criterion's applicability under state law, DOW discontinued the exemption process that was part of the settlement and began drafting permits using the federal criterion of a 600 mg/l chloride value, and modified the earlier KPDES drafts to conform to the 600 mg/l value. At the end of 1987, a total of 63 permits covering 250 oil and gas leases had been issued. In addition to permitting operations, DOW has been involved in 660 legal cases between January 1985 and November 1987. A total of 460 cases have been resolved, of which 259 have resulted in agreed orders.

Adherence to the chloride criterion has significantly improved water quality in parts of the Blaine Creek drainage. As more oil and gas facilities are brought into compliance with the chloride criterion, oil brine-associated water quality problems will be significantly mitigated.

Table 31

Use Nonsupport in Kentucky
Streams Attributable to Brine Discharges

River Basin	USGS Hydrologic Unit	Total Stream Miles Assessed	Miles Fully Supporting Uses	Miles Partially Supporting Uses	Miles Not Supporting Uses
Licking					
Licking River	05100101	7	0	7	0
Burning Fork	05100101	10	0	0	10
State Road Fork	05100101	5	0	0	5
Lick Creek	05100101	9	0	0	9
Kentucky					
Millers Creek	05100204	26	0	0	26
South Fork Red River	05100204	17	0	0	17
*Cow Creek	05100204	6	3	0	3
*Walkers Branch	05100204	8	0	0	8
*Lower Devils Creek	05100204	6	0	0	6
Big Sandy					
Blaine Creek	05070204	162	128	20	14
Little Sandy					
Little Sandy River (Headwaters)	05090104	38	7	3	28
Green					
*Greasy Creek	05110005	7	7	0	0
*Slovers Creek	05110004	3	3	0	0
Buck Creek	05110002	5	5	0	0
Beaver Creek	05110002	35	35	0	0
Upper Cumberland					
Illwill Creek	05130105	5	5	0	0
Roaring Paunch Creek	05130104	16	0	0	16
Little South Fork of Cumberland River	05130104	53	9	44	0
TOTAL		418	202	74	142

*Streams not included on the United States Geological Survey's Hydrologic Unit Map - 1974, State of Kentucky

WETLAND LOSS

Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The importance of these lands is just being fully understood. Their value lies in several aspects which, when taken either partially or as a whole, often exceed the apparent economic value of the land itself. Wetlands are among the most productive of all ecosystems. They are vital for the existence of many species of fish, wildlife, and plants. A summary of primary values includes: (1) natural moderation of floods, (2) erosion control, (3) water quality enhancement, (4) groundwater recharge, (5) fish and wildlife habitat, (6) recreation, (7) education and scientific research, (8) aesthetic and open space, and (9) food and fiber productivity.

According to the most recent (1979) U. S. Fish and Wildlife Service classification system, the majority of Kentucky's wetlands fall into the Palustrine System. Areas lying shoreward of rivers and lakes, including floodplains, oxbows, ponds, marshes, and swamps, are members of this category. The broad alluvial floodplains of the Ohio and Mississippi rivers and their tributaries in western Kentucky comprise the vast majority of Kentucky wetlands. Small ponds are common throughout the state and their area is difficult to assess. They are, however, very important and have value as ecological epicenters. The Riverine System includes all wetlands and deepwater habitats contained within a channel that experiences continuous or periodic moving water or connects two bodies of standing water. While wetlands of this type are not extensive, they provide a unique habitat for many rare or endangered species and are ecologically important. Lacustrine systems in Kentucky are limited to man-made lakes, their shorelines, and spillways. The Lacustrine systems are the least ecologically significant type of Kentucky wetland.

The loss of valuable wetland resources, and adverse impacts to remaining areas, are of special concern to Kentucky. Over half of the original wetland acreage has been destroyed. Nearly all of the areas that remain have been degraded by pesticides, acid mine drainage, siltation, brine water, or domestic and industrial sewage. In addition, Kentucky still does not have a wetlands monitoring program (a problem identified in the 1984 and 1986 305(b) reports) and there continues to be a poor understanding of what once occurred, what is left, and current impacts and rates of loss.

In 1985 the Division of Water provided funding to the Kentucky Nature Preserves Commission (KNPC), under a Memorandum of Agreement in order to determine the status of Kentucky's wetlands and recommend methods for protection of remaining areas. Their report, "Wetland Protection Strategies for Kentucky," was released in 1986. Among their findings was an estimate that as of 1978, fifty-eight percent or 929,000 of the original 1,566,000 acres of wet soils in Kentucky had been drained. Further, it was estimated that only 20 percent of Kentucky's wet soils remain forested, which reflects a dramatic decline in bottomland hardwood wetlands. The Kentucky Department of Fish and Wildlife Resources estimates Kentucky's annual rate of wetland loss at 3,600 acres.

The major threat to Kentucky wetlands is their destruction from competing land use activities and poor land management practices. Both coal mining and agricultural practices are depleting this unique habitat. Strip mining operations in the western Kentucky coalfield are either totally destroying (by actually stripping coal

from wetland areas), or drastically altering (by siltation and acid mine drainage), many of Kentucky's wetlands. In 1983, a U.S. Fish and Wildlife Service study in the Western Kentucky Coalfield, determined that 515 stream miles were affected by acid mine drainage. Problem parameters degrading water quality included manganese, sulfate, aluminum, conductivity, turbidity, dissolved oxygen, pH, and iron. It was concluded that nearly all of the wetlands in the coalfield have been adversely impacted by coal mining practices.

Logging and agricultural practices, such as channelizing, tile draining, burning, and otherwise altering the water regime to render the land tillable, are rapidly depleting wetland ecosystems. Other agricultural practices which cause erosion, and chemical fertilizer and pesticide runoff, are also having adverse effects on the natural system. To a lesser extent and generally in localized situations, domestic and industrial sewage discharge, oil brine discharge, and urbanization are having detrimental effects on Kentucky wetlands.

There is a general lack of specific information on the extent, rate of loss, and quality (chemical and biological) of Kentucky wetlands. Other needs for Kentucky wetlands include an increased public awareness of the value of these ecosystems, acquisition and protection of strategic wetlands, a definition of regulated wetlands, and regulations specifically addressing wetlands.

SECTION 401 WATER QUALITY CERTIFICATION

Section 401 of the Clean Water Act (CWA) provides that "any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, that any such discharge will comply with the applicable provisions . . . of this Act." Section 401 further provides that "any certification provided under this section shall assure that any applicant for a Federal license or permit will comply with any applicable effluent limitations and other limitations, . . . standard of performance, . . . or prohibition, effluent standard, or pretreatment standard under . . . this Act, and with any other appropriate requirements of State law set forth in such certification, and shall become a condition on any Federal license or permit subject to the provisions of this section." Chapter 224 of the Kentucky Revised Statutes and Title 401, Chapter 5, Kentucky Administrative Regulations, provide that the Natural Resources and Environmental Protection Cabinet has the authority to regulate the discharge of pollutants (including "dredged spoil, solid waste, incinerator residue, sewage, sewage sludge, garbage, chemical, biological or radioactive materials, heat, wrecked or discarded equipment, rock, sand, soil, industrial, municipal or agricultural waste, and any substance resulting from the development, processing or recovery of any natural resource which may be discharged into water") into any of the waters of the Commonwealth, including wetlands, and is the Section 401 (CWA) "certifying agency." Title 40, Code of Federal Regulations, Part 121 provides that the certifying agency may place "any conditions which are deemed necessary or desirable with respect to the discharge or the activity."

Although Section 401 has been in existence since 1970, confusion still exists concerning the appropriate and potential use of this section of the Clean Water Act. While attempting to protect Kentucky's aquatic resources through application of Section 401, many problems have been encountered. Federal guidance detailing the use and application of Section 401 water quality certification (WQC) is needed in order to solve such problems.

Specific areas of concern are:

(a) Currently, the U.S. Army Corps of Engineers (COE) does not request WQC for Section 10 activities, regardless of the potential impact to water quality and aquatic life. This appears in conflict with the provisions of Section 401.

(b) Section 401(d) provides the certifying agency with the authority to "condition" WQC, but does not provide any guidance. Does Section 401 allow the use of conditions that require mitigation or restoration?

(c) Is the review process, under Section 401, limited to the construction phase of the activity or should it include post construction impacts, i.e., the operation of a marina or a coal and sand dredging operation?

(d) Section 401 offers no guidance for after-the-fact permits. Because of the inability to evaluate the effects on water

quality by such activities after-the-fact, WQC is generally waived. Should restoration and/or mitigation be considered under Section 401?

(e) Wetlands are defined in federal/state regulations as waters of the United States/Commonwealth. However, because of their unique characteristics, typical water quality standards often don't apply. Guidance for specific wetland standards is needed.

(f) Should the state utilize the Section 404(b)(1) guidelines (40 CFR 230) to interpret the significance of degradation by an activity under the state antidegradation policy for WQC?

Kentucky has experienced difficulty with the consistent implementation of Section 401 provisions within the framework of the state's water pollution control program. These problems are exaggerated by the lack of guidance at the federal level (i.e., EPA and the COE). Section 401 has the potential to play a significant role in carrying out the intentions of the CWA, i.e., "to restore and maintain the chemical, physical, and biological integrity of the Nations waters." However, without additional federal guidance and funding assistance, this potential will not be realized.